

A REVIEW AND CHECKLIST OF THE PARASITIC MITES (ACARINA) OF THE FALCONIFORMES AND STRIGIFORMES

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ABSTRACT.—Referenced checklists are provided of the 86 species of parasitic feather, quill, respiratory, skin, and nest mites (Acarina) that are known from 116 species of hawks, eagles, falcons, and vultures, and the 91 species of parasitic mites known from 51 species of owls.

KEY WORDS: *Falconiformes; Strigiformes; falcons; hawks; eagles; vultures; owls; parasites; mites; Acarina.*

Un resumen y listado de piojos (Acarina) en Falconiformes y Strigiformes

RESUMEN.—Se provee un listado referenciado de 86 especies de piojos (Acarina) en plumas, quilla, aparato respiratorio, piel y nidos conocidos a partir de 116 especies de gavilanes, águilas, halcones, y buitres y de 91 especies de piojos conocidos a partir de 51 especies de búhos.

[Traducción de César Márquez]

This review summarizes our current knowledge of the host-parasite relationships between parasitic mites and members of the Falconiformes and Strigiformes (Appendices 1 and 2). Over the years, there have been many taxonomic name changes within birds and especially mites, so my review updates old host records to current nomenclature, as well as indicating accidental or misidentified records that should not be regarded as very significant. Nonparasitic nest mites and parasitic mites from prey occur accidentally on raptors, and birds in captivity or specimen bags may pick up mites from other species as well. My review also includes records of some new species, as yet undescribed, which I have found through necropsies of raptors.

There are 21 families of mites that are associated with falconiforms and 17 families associated with owls. Mites inhabit birds' feathers, quills, skin and subcutaneous tissues, respiratory tracts, and nests, and feed on blood, tissue fluid, skin and feather lipids and debris, keratin, fungi, algae, and other mites (Philips 1990, 1993). The mite fauna of most falconiform and strigiform species is completely unknown, but these raptors can host a diverse mite community with as many as eight mite species known from the Black Kite (*Milvus migrans*) and 18 species known from the Long-eared Owl (*Asio otus*). Since mites are so small (0.3–1.5 mm long), they are often overlooked, but raptors that appear parasite-free to the eye can support populations of 15 000 feather mites and 4000 quill mites. Fortu-

nately, most mites on raptors are not very pathogenic and feather mites in particular are usually more commensal, rarely causing harm unless they become extremely abundant.

Feather Mites. There are seven families of falconiform feather mites: Analgidae (*Ancyralges*), Avanzoariidae (*Bonnetella*), Cheylabididae (*Cheylabis*, *Hemicheylabis*), Gabuciniidae (*Aetacarus*, *Aposolenidia*, *Hieracolichus*, *Ramogabucinia*), Kramerellidae (*Pseudogabucinia*), Pterolichidae (*Pseudaloptinus*), and Xolalgidae (*Analloptes*, *Dubininia*). *Ancyralges* occurs only on vultures and *Bonnetella* occurs only on Ospreys (*Pandion haliaetus*). Only a few individuals of *Ancyralges* have been collected, but over 300 *Bonnetella* have been found on an Osprey (Miller et al. 1997). The cheylabidid, gabuciniid, and pterolichid genera which occur on raptors do not occur on other orders of birds, except for *Aetacarus* which includes two species associated with the Otididae. In these genera, species range from monoxenous to polyxenous. *Pseudogabucinia*, *Analloptes*, and *Dubininia* are found on several orders of birds but their falconiform species are restricted to this order. *Aetacarus*, *Hieracolichus*, *Pseudaloptinus*, and *Pseudogabucinia* live on the wings, especially the primaries and upper primary wing coverts. Over 15 000 *Pseudaloptinus* have been found on a single Bald Eagle (*Haliaeetus leucocephalus*). Feather mites feed on feather fragments, lipids secretions, skin debris, and feather fungi, bacteria, and algae. The diet of *Aetacarus* and *Pseudaloptinus* includes fresh-

water diatoms which stick to feathers when birds are in water (Dubinin 1956). In great numbers, feather mites irritate the host with damage resulting from the bird's stress and feather pulling. Vas-yukova and Labutin (1990) found that feather mites occurred on 22% of falconiform birds and 77% of owls in Yakutia.

There are three families of owl feather mites: Kramerellidae (*Dermonoton*, *Kramerella*, and *Petitota*), Psoroptoididae (*Pandahura*), and Xolalgidae (*Glaucalges*). These genera only occur on owls with the exception of one species of *Glaucalges* which occurs on Musophagidae. *Kramerella* species are very host specific, occupy primarily wing feathers, and are often very numerous (thousands) on an individual. Philips (1993) photographed Great Horned Owl (*Bubo virginianus*) alula feathers with *Kramerella* infestations. *Kramerella* is very common on owls and was found on 86% of Eurasian Pygmy-Owls (*Glaucidium passerinum*) in Thuringia (Cerný and Wiesner 1992). *Petitota*, *Pandahura*, and *Glaucalges* species are more polyxenous and typically occur in smaller numbers on a host (Atyeo and Philips 1984). *Dermonoton* also is more polyxenous but population data are lacking.

Quill Mites. There are two families of falconiform quill mites: Ascouracaridae (*Pyonacarus*) and Syringophilidae (*Peristerophila*, undescribed genera). Ascouracarid mites occur on seven orders of birds but *Pyonacarus* is known only from the Black Kite (*Milvus migrans*). These mites eat the medulla of quills. Syringophilid mites use their mouthparts to pierce the quill wall and feed on tissue fluid from the feather follicle. Feather loss and secondary bacterial infection can result. Each genus of Syringophilidae is primarily or exclusively associated with a particular order of birds. *Peristerophila* is a columbiform mite and *P. columbae* is known from pigeons (*Columba livia*) and its occurrence on a Red-tailed Hawk (*Buteo jamaicensis*) (Casto 1976) is unusual and may be accidental. I have found a new genus of syringophilid mite that occurs on five North American accipitrid birds. Trunk and scapular feathers are preferred by falconiform syringophilid mites.

There are three families of owl quill mites: Dermoglyphidae (*Paralges*), Oconnoriidae (*Oconnoria*), and Syringophilidae (*Bubophilus*). Dermoglyphid mites can cause extensive mange because owls use their beaks to dig them out. *Paralges* occurs on several orders of birds, but the undescribed species from owls (Philips 1993) have not been found on other

orders. In owls, *Paralges* colonizes the upper and under trunk feathers but populations over 10 have not yet been found on an individual owl. The family Oconnoriidae is known only from the Philippine Boobook Owl (*Ninox philippensis*) and probably eats the medulla of quills (Gaud et al. 1989). The syringophilid genus *Bubophilus* is known only from the Great Horned Owl (Philips and Norton 1978). Two thousand *Bubophilus* have been found on one bird, inhabiting mainly axillary and nearby wing feathers. Infestations of Great Horned Owl quills with *Paralges* and *Bubophilus* were photographically documented by Philips (1993).

Skin Mites. Skin mites of falconiform birds which live on the skin surface or burrow into the skin include the families Cheyletiellidae, Epidermoptidae (*Microlichus* and *Myialges*), Harpyrhynchidae (*Harpyrhynchus*), and Knemidocoptidae (*Knemidocoptes*). Cheyletiellid mites feed on blood and tissue fluid, and most species are associated with a particular family of birds. *Microlichus* and *Myialges* are also associated with louseflies (Hippoboscidae) and are more fly specific. Their bird host range tends to correspond to that of their fly host. Fertilized *Myialges* females parasitize louseflies and lay their eggs on them, but the other stages of the life cycle are bird parasites. *Microlichus* is phoretic on louseflies and uses them only for a ride to another bird host. *Microlichus* lives in feather bulbs, producing congestion and swelling. These skin mites feed on surface skin debris, keratin, and tissue fluid.

Skin mites of owls which live on the skin surface or burrow into the skin include the families Analgidae (*Strelkoviacarus*), Epidermoptidae (*Microlichus*, *Myialges*, *Passeroptes*), Harpyrhynchidae (*Harpyrhynchus*), and Knemidocoptidae (*Knemidocoptes*). *Strelkoviacarus*, like *Microlichus*, is phoretic on louseflies with a broad avian host range. *Passeroptes* occurs on Passeriformes and Columbiformes as well as owls, but individual species are restricted to one order of bird host.

Harpyrhynchid and knemidocoptid mites burrow into the skin, causing itching and mange. Harpyrhynchid mite species usually have only one avian host species and occur on the calamus at the skin surface and in subcutaneous cysts. Schulz (1990) photographically documented feather loss on the head and neck of a Golden Eagle (*Aquila chrysaetos*) caused by harpyrhynchid mites. This pathology has not been observed in owls. Philips (1993) photographed a harpyrhynchid embedded

in the skin of a Boreal Owl (*Aegolius funereus*). Most knemidocoptid mite species are polyxenous within an order of birds, but those found on owls also occur on other bird orders. Knemidocoptid mites live in the stratum corneum of the skin, causing hyperplasia, hyperkeratosis, and inflammation. They cause scaly encrustations on the beak and claws, known as scaly face and scaly leg disease. This condition in a Great Horned Owl (*Bubo virginianus*) was documented photographically by Schulz et al. (1989) and is common in cage birds, but there is only one record of these mites on falconiform birds (Cooper 1978, 1985).

Transient skin mites of both bird orders include the blood-feeding Dermanyssidae (*Dermanyssus*), Macronyssidae (*Ornithonyssus*), and Laelapidae (*Androlaelaps*), and tissue-fluid feeding Trombiculidae (chiggers). Falconiform chiggers include *Blankaartia*, *Eutrombicula*, *Leptotrombidium*, *Neoschoengastia*, *Odontacarus*, and *Ornithogastia*, while strigiform chiggers include *Blankaartia*, *Euschoengastia*, *Eutrombicula*, *Hyponeocula*, *Leptotrombidium*, *Miyatrombicula*, *Neoschoengastia*, *Odontacarus*, *Ornithogastia*, and *Toritrombicula*. Dermanyssid and macronyssid bird parasites lay eggs on the host or in its nest and chiggers are the parasitic larval stage of a predatory soil mite. All four families usually have relatively low host specificity and can cause dermatitis. Too much blood loss results in energy and weight loss, anemia, and potentially death. *Ornithonyssus* often prefers to feed at the vent. *Dermanyssus* feeds at night. *Dermanyssus* on a Sharp-shinned Hawk (*Accipiter striatus*) was photographed by Philips (1993). Avian *Androlaelaps* species are facultative blood suckers which also prey on other invertebrates and their eggs, on birds, and in their nests. Bird chiggers usually remain attached for three to four days at the thighs, anus, or under the wings.

Subcutaneous Mites. The Hypoderatidae (*Gypsodectes*, *Neottialges*, and *Tytodectes* on hawks, kestrels, and vultures; *Hypodectes*, *Neottialges*, *Neotyodectes*, and *Tytodectes* on owls) are subcutaneous bird mites as nymphs. Nonfeeding adults lay eggs in birds' nests. Nymphs colonize nestlings and adults and live on the surface of breast and abdominal muscles, in fat tissue and, occasionally, in respiratory and circulatory tracts. Lacking a mouth, nutrients are absorbed through the skin. Significant pathological effects from these mites remain unproven, however. Most species of hypoderatid mites have limited host ranges, but a significant number of unusual one-time host

records suggests temporarily successful colonization of other bird hosts in nesting proximity is not uncommon (Pence et al. 1997). This appears to be the case with the record of *Hypodectes propus* from the Burrowing Owl (*Speotyto cunicularia*) and *Neottialges evansi* from the Barn Owl (*Tyto alba*). *H. propus* is associated with pigeons, herons, and egrets and *N. evansi* is a cormorant mite. *Gypsodectes* is known only from vultures; *Neotyodectes* is known only from owls. *Neottialges* is known from four orders of birds, but the species on falconiform birds are monoxenous. *Tytodectes* occurs on owls, falcons, and kingfishers and each species occurs on only one host genus. Several infestations in the Barn Owl were photographically documented by Wurst and Havelka (1997).

Respiratory Mites. Respiratory mites of falconiform birds include the families Ereynetidae (*Boyardia*, *Speleognathopsis*), Rhinonyssidae (*Falconyssus*, *Ptilonyssus*, *Tinaminyssus*), and Turbinoptidae (*Schoutedencoptes*). Ereynetid mites feed on mucous deep in the nasal cavity and nonpasserine ereynetid mites are monoxenous or parasitize very few host species. Molted ereynetid mite skins can partially block the nasal cavity. Rhinonyssid mites feed on blood and occupy the anterior portion of the nasal cavity, usually in very small numbers. Each species of these rhinonyssid genera usually has only one or several host species. The genus *Falconyssus* occurs on falconiform and alcedinid birds, while *Ptilonyssus* and *Tinaminyssus* occur on many types of birds. Turbinoptid mites live in the external part of the nares and feed on the corneous skin there. Most turbinoptid species are monoxenous or restricted to one family of birds.

Respiratory mites of owls include the families Cloacaridae (*Pneumophagus*), Ereynetidae (*Astrida*, *Aureliania*, *Neoboydaia*), and Rhinonyssidae (*Rhinoecius*, *Sternostoma*). The Cloacaridae is primarily a family of turtle cloaca mites. One genus is a subcutaneous small mammal parasite and one genus is an owl parasite. *Pneumophagus* is known only from two dozen individuals from the trachea and bronchi of a Great Horned Owl in Michigan (Fain and Smiley 1989). Among the ereynetid mites, *Aureliania* is known only from Barn Owls (*Tyto alba*), *Astrida* is known from owls and Caprimulgiformes, and *Neoboydaia* is known from several orders of birds. *Rhinoecius* is restricted to owls, each species parasitizing one or several owl species. Philips (1993) photographed *Rhinoecius* in the nasal cavity of a Boreal Owl. The genus *Sternostoma* parasitizes many bird orders but most species are restricted to

one or several host species. *Sternostoma tracheacolum*, the canary lung mite, parasitizes passerines and parrots, infiltrating the lung sacs and causing mortality, but the other species remain in the nares and seem to do minimal damage to their hosts. Fleay (1968) suggested that *Kytodites nudus* (the air sac mite, Kytoditidae) may occur in *Ninox strenua*, based on a report by a veterinarian who suspected its presence, but did not find it. This mite feeds on serous secretions in the air sacs of chickens and turkeys and has not been found in owls.

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Appendix 1. A list of the parasitic mites of the Falconiformes.

RAPTOR	MITE	HABITAT	REFERENCES
Family Accipitridae	Epidermoptidae ^a	skin	Herman 1945
	<i>Knemidocoptes</i> sp.	skin	Cooper 1978, 1985
Shikra (<i>Accipiter badius</i>)	<i>Coraciacarus</i> sp. ^b	feathers	McClure and Ratanaworabhan 1971
	<i>Hieracolichus nisi</i>	feathers	Dubinini 1956
	<i>Schoutedenoctes aquilae</i>	nasal cavity	Fain 1977
Bicolored Hawk (<i>Accipiter bicolor</i>)	mites ^a	skin	Bequaert 1953, Maa 1969
Chestnut-Flanked Sparrowhawk (<i>Accipiter castanilius</i>)	<i>Aetacarus andrei</i>	feathers	Gaud 1983b
Cooper's Hawk (<i>Accipiter cooperii</i>)	<i>Neonyssus</i> sp. ^b	nasal cavity	Peters 1936
	Syringophilidae n.g.	quills	Philips, present work
Brown Goshawk (<i>Accipiter fasciatus</i>)	<i>Speleognathopsis accipitris</i>	nasal cavity	Domrow 1969, Domrow 1991
Northern Goshawk (<i>Accipiter gentilis</i>)	mites ^a	skin	Walter 1989
	<i>Pseudalloptinus aquilinus</i> ^{b,c}	feathers	Nordberg 1936, Niethammer 1938, Dubinini 1956
	<i>Hieracolichus nisi</i>	feathers	Niethammer 1938, Dubinini 1956
	<i>Hieracolichus</i> n. sp.	feathers	Philips, present work
	<i>Neottialges vitzthumi</i>	subcutaneous	Vitzthum 1934, Fain 1967
	<i>Ornithonyssus sylviarum</i>	skin/nest	Cooper 1978, 1985
Slaty-mantled Sparrowhawk (<i>Accipiter luteoschistaceus</i>)	mites ^a	skin	Maa 1966
Black Goshawk (<i>Accipiter melanoleucus</i>)	<i>Schoutedenoctes aquilae</i>	nasal cavity	Fain 1956c, 1957
Little Sparrowhawk (<i>Accipiter minullus</i>)	<i>Aetaecarus andrei</i>	feathers	Gaud 1983b
	<i>Schoutedenoctes aquilae</i>	nasal cavity	Fain 1956c, 1957
Eurasian Sparrowhawk (<i>Accipiter nisus</i>)	mites ^a	skin	Newton 1979, Walter 1989
	<i>Cnemidocoptes</i> spp.	skin	Malley and Whitbread 1996
	<i>Dermoglyphus elongatus</i> ^b	quills	Dubinini 1956
	<i>Dubinina accipitrina</i>	feathers	Niethammer 1938
	<i>Hieracolichus nisi</i>	feathers	Canestrini and Kramer 1899, Niethammer 1938, Radford 1953, Dubinini 1956, Vasilev 1961, 1962, Shumilo et al. 1973, Mironov 1997
	<i>Megninia</i> sp. ^b		Niethammer 1938
	<i>Microlichus avus</i> ^a	skin	Walter 1989
	<i>Microlichus</i> sp. ^{a,b}	skin	Ash and Hughes 1952
	<i>Myialges?</i> sp. ^a	skin	Ash and Hughes 1952
	<i>Myialges unicus</i> ^a	skin	Walter 1989
	<i>Ornithonyssus bursa</i>	skin/nest	Anon. 1963
Grey Goshawk (<i>Accipiter novaehollandiae</i>)	mites ^a	skin	Maa 1966, 1969

Appendix 1. Continued.

RAPTOR	MITE	HABITAT	REFERENCES
Ovampo Sparrowhawk (<i>Accipiter ovampensis</i>)	<i>Aposolenidia anomogonima</i>	feathers	Gaud and Atyeo 1974
Sharp-shinned Hawk (<i>Accipiter striatus</i>)	<i>Schoutedenoctes aquilae</i>	nasal cavity	Fain 1956c, 1957
	mites ^a	skin	Bequaert 1953, Fain 1965, Maa 1969
	<i>Dermanyssus americanus</i>	skin/nest	Philips 1993
African Goshawk (<i>Accipiter taylori</i>)	<i>Ornithonyssus iheringi</i>	skin/nest	Dusbábek and Cerný 1971
	<i>Syringophilae</i> n.g.	quills	Philips, present work
	<i>Aetacarus andrei</i>	feathers	Gaud 1983b
	<i>Myialges asturi</i>	skin	Fain 1965
Crested Goshawk (<i>Accipiter trivirgatus</i>)	<i>Myialges falconis</i>	skin	Fain 1965
	feather mites	feathers	Maa and Kuo 1965
Besra (<i>Accipiter virgatus</i>)	mites ^a	skin	Maa 1966
	feather mites	feathers	Maa and Kuo 1965
	mites ^a	skin	Maa 1966
	<i>Hieracolichus nisi</i>	feathers	Dubinín 1956
Golden Eagle (<i>Aquila chrysaetos</i>)	<i>Ornithonyssus bursa</i>	skin/nest	McClure and Ratanaworabhan 1971
	<i>Harpyrhynchus</i> sp.	skin	Schulz 1990
Greater Spotted Eagle (<i>Aquila clanga</i>)	<i>Pseudalloptinus aquilinus</i>	feathers	Trouessart 1884, Lönnfors 1930, Radford 1953, 1958, Dubinín 1956
	<i>Sarcoptes rupicaprae</i> ^b	mammals	Valentincic and Kušej 1989
	<i>Pseudalloptinus aquilinus</i>	feathers	Dubinín 1956
Imperial Eagle (<i>Aquila heliaca</i>)	<i>Pseudalloptinus aquilinus</i>	feathers	Dubinín 1956
Lesser Spotted Eagle (<i>Aquila pomarina</i>)	<i>Pseudalloptinus aquilinus</i>	feathers	Radford 1953, 1958, Dubinín 1956
African Tawny-Eagle (<i>Aquila rapax</i>)	<i>Pseudalloptinus aquilinus</i>	feathers	Dubinín 1956
	<i>Pyonacarus</i> sp.	quills	Atyeo pers. comm.
	<i>Schoutedenoctes aquilae</i>	nasal cavity	Fain 1956c, 1957, Gaud and Till 1961
Verreaux's Eagle (<i>Aquila verreauxii</i>)	<i>Hieracolichus dobyi</i>	feathers	Gaud 1983b
Wahlberg's Eagle (<i>Aquila wahlbergi</i>)	<i>Hieracolichus dobyi</i>	feathers	Gaud 1983b
Grey-lined Hawk (<i>Asturina nitida</i>)	<i>Hemicheylabis praecox</i>	feathers	Trouessart 1885, Gaud and Atyeo 1984
African Baza (<i>Aviceda cuculoides</i>)	<i>Aetacarus avicedae</i>	feathers	Gaud 1983b
	<i>Hieracolichus ostodus</i>	feathers	Gaud 1983b
Pacific Baza (<i>Aviceda subcristata</i>)	<i>Tinaminyssus epileus</i>	nasal cavity	Wilson 1964, 1965
Grasshopper Buzzard (<i>Butastur rufipennis</i>)	<i>Schoutedenoctes aquilae</i>	nasal cavity	Fain 1956b, 1957
	<i>Buteo</i> sp.	skin/nest	Wharton and Fuller 1952
Zone-tailed Hawk (<i>Buteo albonotatus</i>)	<i>Blankaartia allei</i>	skin/nest	Philips 1978
Augur Buzzard (<i>Buteo augur</i>)	<i>Eutrombicula alfreddugesi</i> ^c	skin/nest	Philips 1978
Common Buzzard (<i>Buteo buteo</i>)	<i>Falconyssus buteonis</i>	nasal cavity	Fain 1956b
	<i>Pseudalloptinus aquilinus</i> ^{b,c}	feathers	Nordberg 1936, Niethammer 1938
	<i>Harpyrhynchus tracheatus</i>	skin	Fritsch 1954
	<i>Hieracolichus nisi</i>	feathers	Canestrini and Kramer 1899, Radford 1953, 1958
	<i>Myialges parv</i> ^a	skin	Büttiker and Cerný 1974
	Prostigmata larva ^a	skin	Büttiker and Cerný 1974
	<i>Pseudogabucinia intermedia</i>	feathers	Gaud 1988

Appendix 1. Continued.

RAPTOR	MITE	HABITAT	REFERENCES
Galapagos Hawk (<i>Buteo galapagoensis</i>)	mites ^a <i>Myialges caulotoon</i> ^a	skin skin	Maa 1969 Harmon et al. 1990, Madden and Harmon 1998
Red-tailed Hawk (<i>Buteo jamaicensis</i>)	mites ^a <i>Aetacarus</i> n. sp. <i>Eutrombicula alfreddugesi</i> <i>Harpyrhynchus</i> sp. <i>Myialges falconis</i> ^a <i>Peristerophila columbae</i> <i>Schoutedenocoptes aquilae</i> Syringophilidae n.g.	skin feathers skin/nest skin skin quills nasal cavity quills	Bequaert 1953, Maa 1969 Philips, present work Loomis 1956 Philips, present work Philips and Fain 1991 Casto 1976 Fain 1956b, 1957 Philips, present work
Red-shouldered Hawk (<i>Buteo lineatus</i>)	<i>Haemogamasus reidi</i> ^b <i>Hieracolichus</i> n. sp. <i>Pseudalloptinus</i> sp.	mammals feathers feathers	Redington 1970 Kurey 1976 Kurey 1976
Roadside Hawk (<i>Buteo magnirostris</i>)	mites ^a <i>Myialges bombycillae</i> ^a <i>Ptilonyssus souzai</i>	skin skin nasal cavity	Maa 1969 Philips and Fain 1991 Pereira and Castro 1949
Broad-winged Hawk (<i>Buteo platypterus</i>)	<i>Hieracolichus</i> n. sp. Syringophilidae n.g.	feathers quills	Philips, present work Philips, present work
Ferruginous Hawk (<i>Buteo regalis</i>)	mites		Bechard and Schmutz 1995
Swainson's Hawk (<i>Buteo swainsoni</i>)	<i>Hieracolichus</i> sp.	feathers	Kurey 1976
Great Black-Hawk (<i>Buteogallus urubitinga</i>)	mites ^a <i>Eutrombicula batatas</i>	skin skin/nest	Maa 1969 Brennan and Yunker 1966
Short-toed Snake Eagle (<i>Circus gallicus</i>)	<i>Hieracolichus nisi</i>	feathers	Canestrini and Kramer 1899, Radford 1953, 1958, Dubinin 1956
Western Marsh-Harrier (<i>Circus aeruginosus</i>)	<i>Pseudalloptes bisubulatus</i> ^b <i>Pseudogabucinia intermedia</i>	feathers feathers	Dubinin 1956 Dubinin 1956
Cinereous Harrier (<i>Circus cinereus</i>)	Ingrassiinae sp. ^a	feathers	Philips and Fain 1991
Northern Harrier (<i>Circus cyaneus</i>)	<i>Pseudogabucinia intermedia</i>	feathers	Dubinin 1956, Cerný 1967, Kurey 1976
Pallid Harrier (<i>Circus macrourus</i>)	mites ^a <i>Aetacarus leptotrichus</i> <i>Myialges macdonaldi</i> ^a	skin feathers skin	Maa 1966 Gaud 1983b Philips and Fain 1991
Montagu's Harrier (<i>Circus pygargus</i>)	<i>Hieracolichus nisi</i> <i>Pseudogabucinia intermedia</i>	feathers feathers	Canestrini and Kramer 1899, Nie-thammer 1938, Radford 1953 Dubinin 1956
Swallow-tailed Kite (<i>Elanoides forficatus</i>)	<i>Aetacarus</i> sp. <i>Macrocheles</i> sp. ^b <i>Ornithonyssus bursa</i>	feathers feathers litter/nest skin/nest	Meyer 1995 Meyer 1995 Meyer 1995
Black-winged Kite (<i>Elanus caeruleus</i>)	<i>Cheylabis latus</i> <i>Falconyssus elani</i> <i>Neottialges elani</i>	feathers nasal cavity subcutaneous	Gaud and Atyeo 1984 Fain 1966a Fain 1969
Australian Black-shouldered Kite (<i>Elanus notatus</i>)	<i>Cheylabis latus</i> <i>Odontacarus australiensis</i> <i>Ornithonyssus bursa</i>	feathers skin/nest skin/nest	Gaud 1983a Domrow 1966, 1991 Domrow 1966
Palm-nut Vulture (<i>Gypohierax angolensis</i>)	mites ^a <i>Aetacarus hyalothrix</i> <i>Hieracolichus orthochaetus</i> <i>Myialges</i> n. sp. ^a <i>Pseudalloptinus africanus</i> <i>Pseudalloptinus odontopus</i>	skin feathers feathers skin feathers feathers	Maa 1966 Gaud and Mouchet 1959b, Gaud and Till 1961, Gaud 1983b Gaud and Mouchet 1959b, Gaud 1983b Philips and Fain 1991 Gaud 1988 Gaud and Till 1961, Gaud 1988

Appendix 1. Continued.

RAPTOR	MITES	HABITAT	REFERENCES
White-backed Vulture (<i>Gyps africanus</i>)	<i>Ancyralges cometus</i>	feathers	Gaud 1966, 1988
	<i>Hemichelylabis sikyonemus</i>	feathers	Gaud 1988
	<i>Hieracoliclus africanus</i>	feathers	Gaud and Mouchet 1959b, Gaud and Till 1961, Gaud 1983b
Cape Griffon (<i>Gyps coprotheres</i>)	<i>Gypsodectes verrucosus</i> ^c	subcutaneous	Fain 1984
	<i>Androlaelaps patersoni</i>	skin/nest	Zumpt and Till 1956, Till 1963
	<i>Ramogabucinia doleosikya</i>	feathers	Gaud and Atyeo 1974, Gaud 1983b
Eurasian Griffon (<i>Gyps fulvus</i>)	<i>Gypsodectes vulturis</i>	subcutaneous	Dubinini 1953, 1956, Fain 1967
	<i>Pseudaloptinus aquilinus</i>	feathers	Radford 1953, 1958
White-tailed Eagle (<i>Haliaeetus albicilla</i>)	<i>Aetacarus phylloproctus</i>	feathers	Dubinini 1956
	<i>Megninia picimajoris</i> ^b		Niethammer 1938
	<i>Pseudaloptinus aquilinus</i>	feathers	Dubinini 1956, Vasilev 1961
Bald Eagle (<i>Haliaeetus leucocephalus</i>)	<i>Pterolichus obtusus</i> ^b	feathers	Niethammer 1938
	Analgesidae ^b		Spencer 1941
	<i>Pseudaloptinus aquilinus</i>	feathers	Dubinini 1956, Vasilev 1961
White-bellied Fish-Eagle (<i>Haliaeetus leucogaster</i>)	Syringophilidae n.g.	quills	Philips, present work
	<i>Aetacarus phylloproctus</i>	feathers	Canestrini and Kramer 1899, Gaud and Petitot 1948b, Radford 1953, 1958, Gaud and Atyeo 1974
Pallas's Sea-Eagle (<i>Haliaeetus leucorhynchus</i>)	<i>Pseudaloptinus odontopus</i>	feathers	Gaud and Till 1961, Gaud 1988
	<i>Aetacarus phylloproctus</i>	feathers	Dubinini 1956
	<i>Pseudaloptinus aquilinus</i>	feathers	Dubinini 1956, Vasilev 1961
Steller's Sea-Eagle (<i>Haliaeetus pelagicus</i>)	<i>Pseudaloptinus odontopus</i>	feathers	Gaud and Till 1961, Gaud 1988
	<i>Aetacarus phylloproctus</i>	feathers	Dubinini 1956
Solomon Fish-Eagle (<i>Haliaeetus sanfordi</i>)	<i>Pseudaloptinus aquilinus</i>	feathers	Dubinini 1956, Vasilev 1961
	<i>Ornithogastia riversi</i>	skin/nest	Wharton and Hardcastle 1946, Goff 1979
African Fish-Eagle (<i>Haliaeetus vocifer</i>)	<i>Pseudaloptinus odontopus</i>	feathers	Gaud and Till 1961, Gaud 1988
	<i>Aetacarus puylaerti</i>	feathers	Gaud 1983b
	<i>Hemifreyana marginata</i> ^b	feathers	Gaud and Till 1961
	<i>Hieracoliclus dobyi</i>	feathers	Gaud and Mouchet 1959b
Madagascar Fish-Eagle (<i>Haliaeetus vociferoides</i>)	<i>Pseudaloptinus aquilinus</i>	feathers	Gaud 1988
	<i>Aetacarus</i> sp.	feathers	Aty eo pers. comm.
Brahminy Kite (<i>Haliastur indus</i>)	<i>Aetacarus haliasturi</i>	feathers	Mégnin and Trouessart 1884d, Radford 1953, 1958, Dubinini 1956
	mites ^a	skin	Maa 1969
	<i>Pseudaloptinus milvulinus</i>	feathers	Radford 1953, 1958, Dubinini 1956
Harpy Eagle (<i>Harpia harpyja</i>)	<i>Hieracoliclus hirundo</i>	feathers	Radford 1953, 1958
Solitary Eagle (<i>Harpyhaliaeetus solitarius</i>)	<i>Temnalges</i> sp. ^{a,b}	feathers	Philips and Fain 1991
Ayres's Hawk-Eagle (<i>Hieraaetus ayresii</i>)	<i>Aetacarus eurychaetus</i>	feathers	Gaud and Mouchet 1959b, Gaud and Till 1961, Gaud 1983b
	<i>Hieracoliclus orthochaetus</i>	feathers	Gaud and Till 1961
Bonelli's Eagle (<i>Hieraaetus fasciatus</i>)	<i>Pseudaloptinus aquilinus</i>	feathers	Gaud 1983b
Booted Eagle (<i>Hieraaetus pennatus</i>)	hypopus mites	skin	Hamerton 1941
	<i>Pseudaloptinus aquilinus</i>	feathers	Dubinini 1956
Grey-headed Fish-Eagle (<i>Ichthyophaga ichthyaetus</i>)	<i>Aetacarus phylloproctus</i>	feathers	Radford 1958
Mississippi Kite (<i>Ictinia mississippiensis</i>)	<i>Aetacarus</i> sp.	feathers	Kurey 1976

Appendix 1. Continued.

RAPTOR	MITE	HABITAT	REFERENCES
Lizard Buzzard (<i>Kaupifalco monogrammicus</i>)	<i>Aetacarus andrei</i> <i>Myialges anchora</i> ^a <i>Schoutedenocoptes aquilae</i>	feathers skin nasal cavity	Gaud 1983b Fain 1965 Fain 1959a
White Hawk (<i>Leucopternis albicollis</i>)	<i>Temnalges</i> sp. ^{a,b}	feathers	Philips and Fain 1991
Long-crested Eagle (<i>Lophaetus occipitalis</i>)	<i>Falconyssus buteonis</i> <i>Pseudalloptinus milvulinus</i> <i>Pseudogabucinia intermedia</i>	nasal cavity feathers feathers	Fain 1956b Gaud and Till 1961, Gaud 1988 Gaud 1988
Bat Hawk (<i>Macheiramphus alcinus</i>)	mites ^a <i>Myialges macdonaldr</i> ^a	skin skin	Maa 1966 Philips and Fain 1991
Gabar Goshawk (<i>Melierax gabar</i>)	<i>Schoutedenocoptes aquilae</i>	nasal cavity	Fain 1956b, 1957
Dark Chanting-Goshawk (<i>Melierax metabates</i>)	<i>Aposolenidia anomogonima</i>	feathers	Gaud and Atyeo 1974
Black Kite (<i>Milvus migrans</i>)	<i>Hemicheylabis</i> sp. <i>Aetacarus hyalothrix</i>	feathers feathers	Atyeo pers. comm. Gaud and Mouchet 1959b, Gaud and Till 1961
	<i>Aetacarus milvi</i> <i>Hieracolichus nisi</i> <i>Pseudalloptinus milvulinus</i> <i>Pyonacarus polysarcus</i> <i>Schoutedenocoptes aquilae</i> <i>Tinaminyssus columbae</i>	feathers feathers feathers feathers feathers feathers	Gaud 1983b, D'Souza et al. 1986 Dubinin 1956 Dubinin 1956 Gaud and Atyeo 1976, Gaud 1988 Fain 1956b, 1957 Fain 1957
Red Kite (<i>Milvus milvus</i>)	<i>Pseudalloptinus milvulinus</i>	feathers	Trouessart 1884, Radford 1953, 1958, Dubinin 1956
Hooded Vulture (<i>Necrosyrtes monachus</i>)	<i>Hemicheylabis sikyonemus</i> <i>Hieracolichus monachi</i>	feathers feathers	Gaud 1988 Gaud and Mouchet 1959b, Gaud and Till 1961, Gaud 1983b
	<i>Pseudalloptinus glossocercus</i> <i>Ramogabucinia furciseta</i>	feathers feathers	Gaud 1988 Gaud 1983b
Osprey (<i>Pandion haliaetus</i>)	mites <i>Analloptes buettikeri</i> <i>Analloptes</i> sp. <i>Bonnetella fusca</i>	skin feathers feathers feathers feathers	Bequaert 1953 Mironov 1997 Gaud and Atyeo 1979, Gaud 1983a, Miller et al. 1997 Buchholz 1869, Canestrini and Kramer 1899, Lönnfors 1930, Niethammer 1938, Spencer 1941, Mrciak and Brander 1967, McClure and Ratanaworabhan 1971, Kurey 1976, Gaud 1983a, Mironov 1991, 1997, Miller et al. 1997
Harris' Hawk (<i>Parabuteo unicinctus</i>)	<i>Myialges caulotoon</i> ^a <i>Neoschoengastia americana</i> <i>Pseudalloptinus</i> sp.	skin skin/nest feathers	Philips and Fain 1991 Loomis and Crossley 1963 Atyeo pers. comm.
European Honey-Buzzard (<i>Peris apivorus</i>)	feather mites <i>Hieracolichus nisi</i> <i>Hieracolichus ramosus</i>	feathers feathers feathers	Maa and Kuo 1965 Canestrini and Kramer 1899, Niethammer 1938, Radford 1953 Gaud and Mouchet 1959b, Gaud and Till 1961, Gaud 1983b
African Harrier-Hawk (<i>Polyboroides typus</i>)	<i>Hieracolichus similis</i>	feathers	Gaud and Mouchet 1959b, Gaud and Till 1961, Gaud 1983b
Martial Eagle (<i>Polemaetus bellicosus</i>)	<i>Hieracolichus dobyi</i> <i>Pseudalloptinus aquilinus</i>	feathers feathers	Gaud 1983b
White-backed Vulture (<i>Pseudogyps africanus</i>)	<i>Dermanyssus gallinae</i>	skin/nest	

Appendix 1. Continued.

RAPTOR	MITE	HABITAT	REFERENCES
Snail Kite (<i>Rostrhamus sociabilis</i>)	<i>Ornithonyssus bursa</i>	skin/nest	Philips et al. 1976, Sykes and Forrester 1983, Sykes et al. 1995
Crested Serpent-Eagle (<i>Spilornis cheela</i>)	<i>Coraciacarus cucul^b</i>	feathers	Radford 1958
Changeable Hawk-Eagle (<i>Spi-zaetus cirrhatu</i> s)	<i>Coraciacarus</i> sp. ^b	feathers	McClure and Ratanaworabhan 1971
Crowned Hawk-Eagle (<i>Stephanoaetus coronatus</i>)	<i>Aetacarus hyalothrix</i>	feathers	Gaud and Mouchet 1959b, Gaud and Till 1961
	<i>Hieracolichus dobyi</i>	feathers	Gaud and Mouchet 1959b, Gaud and Till 1961, Gaud 1983b
	<i>Pseudaloptinus odontopus</i>	feathers	Gaud and Till 1961, Gaud 1988
Bateleur (<i>Terathopius ecaudatus</i>)	<i>Hieracolichus dobyi</i>	feathers	Gaud 1983b
White-headed Vulture (<i>Trigonoceps occipitalis</i>)	<i>Hieracolichus monachi</i>	feathers	Gaud 1983b
Long-tailed Hawk (<i>Urotriorchis macrourus</i>)	<i>Myialges caulotoon^a</i>	skin	Philips and Fain 1991
	<i>Pseudogabucinia</i> sp. ^a	feathers	Philips and Fain 1991
Family Cathartidae			
Turkey Vulture (<i>Cathartes aura</i>)	mites ^a	skin	Bequaert 1953, Maa 1969
	<i>Ancyralges</i> sp.	feathers	Kurey 1976
	<i>Hieracolichus</i> sp.	feathers	Peters 1936, Kurey 1976
	<i>Ornithonyssus bursa</i>	skin/nest	Peters 1936
	<i>Ptilonyssus ohioensis</i>	nasal cavity	Fain and Johnston 1966
Lesser Yellow-headed Vulture (<i>Cathartes burrovianus</i>)	<i>Hieracolichus</i> sp.	feathers	Atyeo pers. comm.
Black Vulture (<i>Coragyps atratus</i>)	mites ^a	skin	Bequaert 1953
	<i>Eutrombicula alfreddugesi</i>	skin/nest	Wharton and Fuller 1952
	<i>Hieracolichus</i> sp.	feathers	Kurey 1976
	<i>Histiogaster^{a,b}</i>	trees	Philips and Fain 1991
	<i>Ptilonyssus donatoi</i>	nasal cavity	Pereira and Castro 1949
	<i>Sancassania</i> sp. ^{a,b}	litter/nest	Philips and Fain 1991
Andean Condor (<i>Vultur gryphus</i>)	<i>Hieracolichus</i> spp.	feathers	Atyeo pers. comm.
Family Falconidae			
<i>Falco</i> sp.	mites ^a	skin	Bequaert 1953, Fain 1965
	<i>Ptilonyssus cerchneis</i>	nasal cavity	Bregetova 1964
Saker/Peregrine hybrids	<i>Dermanyssus gallinae</i>	skin/nest	Malley and Whitbread 1996
Grey Kestrel (<i>Falco ardosiaceus</i>)	<i>Pseudaloptes falconis</i>	feathers	Gaud 1983a
Brown Falcon (<i>Falco berigora</i>)	<i>Boydaia falconis</i>	nasal cavity	Domrow 1991
	<i>Leptotrombidium nissani</i>	skin/nest	Domrow and Lester 1985
	<i>Ptilonyssus cerchneis</i>	nasal cavity	Domrow 1965, 1967, 1969
	<i>Odontacarus nadchatrami</i>	skin/nest	Goff 1979
Lanner Falcon (<i>Falco biarmicus</i>)	<i>Pseudaloptes falconis</i>	feathers	Gaud 1983a
	<i>Pseudogabucinia microdisca^b</i>	feathers	Gaud 1983a
Australian Kestrel (<i>Falco cenchroides</i>)	<i>Leptotrombidium nissani</i>	skin/nest	Domrow 1974, Domrow and Lester 1985
	<i>Odontacarus australiensis</i>	skin/nest	Domrow 1966, 1991
	<i>Ornithonyssus bursa</i>	skin/nest	Domrow 1977
	<i>Ornithonyssus sylviarum</i>	skin/nest	Domrow 1987
	<i>Ptilonyssus cerchneis</i>	nasal cavity	Domrow 1965, 1967, 1969
	<i>Pseudaloptes falconis</i>	feathers	Gaud 1983a
Red-necked Falcon (<i>Falco chicquera</i>)	<i>Pseudaloptes falconis</i>	feathers	Gaud 1983a

Appendix 1. Continued.

RAPTOR	MITE	HABITAT	REFERENCES
Saker Falcon (<i>Falco cherrug</i>)	<i>Dermanyssus</i> sp.	skin/nest	Wheeldon pers. comm.
Merlin (<i>Falco columbarius</i>)	<i>Dubininia accipitrina</i>	feathers	Vasilev 1958, Cerný 1967, Gaud 1980, 1983a
	Gabuciniidae	feathers	Kurey 1976
	<i>Hieracolichus</i> sp.	feathers	Gaud 1983a
	<i>Microlichus avus</i> ^a	skin	Hill et al. 1967
African Hobby (<i>Falco cuvieri</i>)	<i>Boyaia falconis</i>	nasal cavity	Fain 1956a
Eleonora's Falcon (<i>Falco eleonora</i>)	Acarina sp.		Wink et al. 1979
	<i>Kramerella major</i> ^b	feathers	Mégnin and Trouessart 1884a
	<i>Pseudogabucinia intermedia</i>	feathers	Dubinin 1953, 1956, Radford 1958, Gaud 1983a
Lesser Kestrel (<i>Falco naumanni</i>)	<i>Dubininia accipitrina</i>	feathers	Gaud and Petitot 1948a, Gaud 1958, 1983a
Peregrine Falcon (<i>Falco peregrinus</i>)	<i>Aetacarus?</i> sp.	feathers	Kurey 1976
	<i>Glaucalgas attenuatus</i> ^a		Niethammer 1938
	<i>Hieracolichus nisi</i>	feathers	Dubinin 1956, Cerný 1967, Gaud 1983a
	<i>Pandalura strigisoti</i> ^b		Niethammer 1938
	<i>Pseudalloptinus</i> sp.	feathers	Kurey 1976, Gaud 1983a
	<i>Pseudogabucinia intermedia</i> ^c	feathers	Nordberg 1936, Niethammer 1938, Dubinin 1953, Radford 1958, Gaud 1983a
Oriental Hobby (<i>Falco severus</i>)	<i>Ornithogastia riversi</i>	skin/nest	Wharton and Hardcastle 1946, Goff 1980
American Kestrel (<i>Falco sparverius</i>)	<i>Dubininia</i> sp. ^c	feathers	Philips 1990
	<i>Tytodectes cerchneis</i> ^c	subcutaneous	Philips and Dindal 1979, Philips 1990
	<i>Blankaartia velascoi</i>	skin/nest	Wharton and Fuller 1952
	<i>Boyaia falconis</i>	nasal cavity	Pence and Casto 1976
	<i>Ptilonyssus cerchneis</i>	nasal cavity	Strandtmann 1962
Eurasian Hobby (<i>Falco subbuteo</i>)	<i>Microlichus falco</i>	skin	Fain and Gaud 1972, Fain et al. 1987, Fain and Grootaert 1996
	<i>Neottialges heteropus</i>	subcutaneous	Giebel 1861, 1871, Fain 1967
	<i>Pseudalloptinus minor</i>	feathers	Mégnin and Trouessart 1884b, Canestrini and Kramer 1899, Dubinin 1956, Gaud 1983a
	<i>Pseudogabucinia intermedia</i>	skin	Niethammer 1938, Radford 1953, 1958, Vasilev 1961, Gaud 1983a
Common Kestrel (<i>Falco tinnunculus</i>)	<i>Boyaia falconis</i>	nasal cavity	Fain 1963a
	<i>Cheyletiella</i> sp. ^d		Niethammer 1938
	<i>Dubininia accipitrina</i>	feathers	Trouessart 1885, Canestrini and Kramer 1899, Niethammer 1938, Radford 1953, 1958, Gaud 1958, 1983a
	<i>Megninia</i> sp. ^b		Niethammer 1938
	<i>Myialges</i> sp. nr. <i>parv</i> ^a	skin	Philips and Fain 1991
	<i>Protolichus lunula</i> ^b	feathers	Vasilev 1961
	<i>Pseudalloptes falconis</i>	nasal cavity	Gaud 1983a
	<i>Ptilonyssus cerchneis</i>	nasal cavity	Fain 1957
	<i>Tytodectes cerchneis</i>	subcutaneous	Fain 1966b
	<i>Tytodectes falconis</i>	subcutaneous	Fain 1969
Red-footed Falcon (<i>Falco vespertinus</i>)	<i>Hieracolichus nisi</i>	feathers	Shumilo et al. 1973, Gaud 1983a

Appendix 1. Continued.

RAPTOR	MITE	HABITAT	REFERENCES
Barred Kestrel (<i>Falco zoniventris</i>)	<i>Aetacarus</i> sp.	feathers	Gaud 1983a
Barred Forest-Falcon (<i>Micrastur ruficollis</i>)	Ingrassiinae sp. ^a	feathers	Philips and Fain 1991
Collared Falconet (<i>Microhierax caerulescens</i>)	<i>Coraciacarus</i> sp. ^b	feathers	McClure and Ratanaworabhan 1971
Philippine Falconet (<i>Microhierax erythrogenys</i>)	mites ^a	skin	Maa 1969
Yellow-headed Caracara (<i>Milvago chimachima</i>)	mites ^a	skin	Bequaert 1953
	<i>Ptilonyssus souzai</i>	nasal cavity	Pereira and Castro 1949
Crested Caracara (<i>Polyborus plancus</i>)	<i>Eutrombicula batatas</i>	skin/nest	Brennan and Yunker 1966
	<i>Hieracoliclus</i> sp.	feathers	Kurey 1976
Family Sagittariidae			
Secretary-bird (<i>Sagittarius ser-pentarius</i>)	<i>Aetacarus laurencei</i>	feathers	Gaud 1983b

^a These mites were found on louseflies (Hippoboscidae) on the bird.

^b These are incorrectly identified or accidental records.

^c Nest record.

^d *Cheyletiella* is now restricted to mammal parasites; there are four other genera of bird parasites in the Family Cheyletiellidae.

Appendix 2. A list of the parasitic mites of the Strigiformes.

OWL	MITE	HABITAT	REFERENCES
Strigiformes	<i>Dermanyssus gallinae</i>	skin/nest	Pfister 1991
	Rhinonyssidae	nasal cavity	Butenko et al. 1972
Family Strigidae	<i>Glaucalges attenuatus</i>	feathers	Radford 1953, 1958
	<i>Kramerella lunulata</i>	feathers	Radford 1953, 1958
	<i>Kramerella byra</i>	feathers	Radford 1953, 1958
	<i>Kramerella major</i>	feathers	Radford 1953, 1958
Northern Saw-whet Owl (<i>Aegolius acadicus</i>)	<i>Dermanyssus americanus</i>	skin/nest	Philips 1990
	<i>Petitota</i> sp.	feathers	Philips, present work
Boreal Owl (<i>Aegolius funereus</i>)	<i>Glaucalges attenuatus</i>	feathers	Niethammer 1938
	<i>Harpyrhynchus</i> n. sp.	skin	Philips 1993
	<i>Kramerella lunulata</i> ^a	feathers	Niethammer 1938, Dubinin 1953, Radford 1958
	<i>Kramerella major</i> ^{a,b}	feathers	Mégnin and Trouessart 1884a, Nordberg 1936, Dubinin 1953, Radford 1958
	<i>Kramerella mrciaki</i>	feathers	Cerný 1973, Mironov 1997
	<i>Kramerella</i> n. sp.	feathers	Philips, present work
	<i>Mesalgoides picimajoris</i> ^a	feathers	Lönnfors 1937
	<i>Paralges</i> sp. ^a	quills	Philips 1993
	<i>Passeroptes</i> n. sp.	skin	Philips 1990
	<i>Petitota aluconis</i>	feathers	Lönnfors 1937
	<i>Petitota haengii</i>	feathers	Mironov 1997
	<i>Rhinoecius aegolii</i>	nasal cavity	Butenko 1971, Philips 1993

Appendix 2. Continued.

OWL	MITE	HABITAT	REFERENCES	
Marsh Owl (<i>Asio capensis</i>)	<i>Dermonoton parallelus</i>	feathers	Gaud and Mouchet 1959b, Gaud and Till 1961, Gaud 1980	
	<i>Kramerella oti</i>	feathers	Gaud 1980	
	<i>Pandalura strigisoti</i>	feathers	Gaud 1980	
	<i>Rhinoecius africanus</i>	nasal cavity	Zumpt and Patterson 1951, Zumpt and Till 1961	
Short-eared Owl (<i>Asio flammeus</i>)	mites ^c	skin	Maa 1966	
	<i>Dermonoton</i> sp.	feathers	Dubinín 1956	
	<i>Glaucalges attenuatus</i>	feathers	Buchholz 1869	
	<i>Kramerella flammei</i>	feathers	Lönnfors 1937	
	<i>Kramerella lyra</i>	feathers	Mégnin and Trouessart 1884a, Radford 1958	
	<i>Kramerella major</i>	feathers	Mégnin and Trouessart 1884a, Radford 1958	
	<i>Kramerella oti</i>	feathers	Vasyukova et al. 1996	
	<i>Kramerella</i> sp.	feathers	Kurey 1976	
	<i>Leptotrombidium akamushi</i>	skin/nest	Wharton and Fuller 1952	
	<i>Microlichus trudicola</i> ^f	skin	Fain et al. 1987	
	<i>Pandalura strigisoti</i>	feathers	Rothschild and Clay 1952	
	<i>Petitota aluconis</i>	feathers	Gaud 1980	
	<i>Proctophyllodes polyxenus</i> ^a	feathers	Atyeo and Braasch 1966	
	<i>Rhinoecius alifanovi</i>	nasal cavity	Butenko 1976	
	Long-eared Owl (<i>Asio otus</i>)	chiggers (Trombiculidae)	skin/nest	Maa and Kuo 1965
		mites ^c	skin	Walter 1989
		<i>Dermanyssus americanus</i>	skin/nest	Moss 1978
		<i>Dermanyssus hirundinis</i>	skin/nest	Kutzer et al. 1982
		<i>Dermonoton parallelus</i>	feathers	Gaud 1980
		<i>Eulaelaps stabularis</i> ^a	mammals	Kutzer et al. 1982
<i>Glaucalges attenuatus</i>		feathers	Buchholz 1869, Canestrini and Kramer 1899, Radford 1953, 1958	
<i>Glycyphagus domesticus</i> ^{a,c}		nest	Büttiker and Cerný 1974	
<i>Harpyrhynchus asio</i>		skin	Fain 1972	
<i>Kramerella lyra</i>		feathers	Mégnin and Trouessart 1884a, Radford 1958	
<i>Kramerella oti</i>		feathers	Lönnfors 1937, Radford 1958, Vasiliev 1959, Cerný 1977, Gaud 1980	
<i>Kramerella</i> sp.		feathers	Kurey 1976	
<i>Microlichus avus</i> ^c		skin	Ash and Hughes 1952	
<i>Microlichus charadriicola</i> ^f		skin	Büttiker and Cerný 1974	
<i>Myialges macdonaldi</i> ^f		skin	Hill et al. 1967	
<i>Myialges nudus</i>		skin	Fain 1965, Fain and Grootaert 1996	
<i>Neotrombicula lipovskyi</i>		skin/nest	Loomis 1956	
<i>Pandalura strigisoti</i>		feathers	Buchholz 1869, Canestrini and Kramer 1899, Radford 1953, 1958, Kurey 1976, Cerný 1977	
<i>Myialges uncus</i> ^c		skin	Ash and Hughes 1952, Fain 1965	
<i>Rhinoecius brikinboricus</i>		nasal cavity	Butenko 1976	
<i>Rhinoecius oti</i>	nasal cavity	Cooreman 1946		
<i>Strelkoviacarus critesi</i> ^c	skin	Hill et al. 1967		
<i>Sternostoma strigitis</i>	nasal cavity	Butenko 1976		

Appendix 2. Continued.

OWL	MITE	HABITAT	REFERENCES
Little Owl (<i>Athene noctua</i>)	<i>Neotrombicula autumnalis</i>	skin/nest	Koptzev et al. 1961
	<i>Glaucalges attenuatus</i>	feathers	Gaud 1958, 1980
	<i>Kramerella lunulata</i>	feathers	Haller 1878, Niethammer 1938, Dubinin 1953, Radford 1958, Gaud 1980
<i>Bubo</i> sp.	<i>Ornithogastia ariadnae</i>	skin/nest	Hushcha 1982
	<i>Pandalura strigisoti</i>	feathers	Gaud 1958, 1980
	<i>Rhinoecius subbisetosus</i>	nasal cavity	Bregetova 1965
	<i>Dermanyssus gallinae</i>	skin/nest	Strandtmann and Wharton 1958
	<i>Dermonoton bubonis</i> ^d	feathers	Gaud 1980
Spotted Eagle-Owl (<i>Bubo africanus</i>)	<i>Astrida caprimulgi</i>	nasal cavity	Fain 1956a, Zumpt and Till 1961
	<i>Dermonoton parallelus</i>	feathers	Gaud 1980
	<i>Glaucalges attenuatus</i>	feathers	Gaud 1980
	<i>Kramerella maculata</i>	feathers	Gaud 1980
	<i>Pandalura strigisoti</i>	feathers	Gaud 1980
	<i>Rhinoecius buboensis</i>	nasal cavity	Fain 1958, 1959b, 1960, Zumpt and Till 1961, Domrow 1969
Eurasian Eagle-Owl (<i>Bubo bubo</i>)	mites ^c	skin	Walter 1989
	<i>Dermonoton longiventer</i>	feathers	Sohn and Noh 1994
	<i>Glaucalges attenuatus</i>	feathers	Lönnfors 1937, Mumcuoglu and Müller 1974
	<i>Kramerella bubonis</i>	feathers	Lönnfors 1937, Dubinin 1953, Radford 1958, Mrciak and Brander 1967
	<i>Kramerella major</i>	feathers	Mégnin and Trouessart 1884a, Dubinin 1953, Radford 1958
	<i>Pandalura strigisoti</i>	feathers	Lönnfors 1937, Mumcuoglu and Müller 1974
	<i>Petitota bubonis</i>	feathers	Atyeo and Philips 1984, Sohn and Noh 1994
Verreaux's Eagle-Owl (<i>Bubo lacteus</i>)	<i>Dermonoton apoplax</i>	feathers	Gaud 1980
	<i>Dermonoton parallelus</i>	feathers	Gaud 1980
	<i>Glaucalges attenuatus</i>	feathers	Gaud 1980
	<i>Kramerella lobata</i>	feathers	Gaud 1980
	<i>Kramerella lunulata</i> ^a	feathers	Radford 1958
	<i>Pandalura strigisoti</i>	feathers	Gaud 1980
Akun Eagle-Owl (<i>Bubo leucostictus</i>)	<i>Dermonoton apoplax</i>	feathers	Gaud 1980
	<i>Glaucalges attenuatus</i>	feathers	Gaud 1980
	<i>Pandalura strigisoti</i>	feathers	Gaud 1980
Fraser's Eagle-Owl (<i>Bubo poensis</i>)	<i>Dermonoton apoplax</i>	feathers	Gaud and Mouchet 1959b, Gaud and Till 1961, Gaud 1980
	<i>Glaucalges attenuatus</i>	feathers	Gaud and Mouchet 1959b, Gaud and Till 1961, Gaud 1980
	<i>Pandalura strigisoti</i>	feathers	Gaud 1980
Shelley's Eagle-Owl (<i>Bubo shelleyi</i>)	<i>Glaucalges attenuatus</i>	feathers	Gaud 1980
	<i>Kramerella lobata</i>	feathers	Gaud 1980
	<i>Pandalura strigisoti</i>	feathers	Gaud 1980

Appendix 2. Continued.

OWL	MITE	HABITAT	REFERENCES	
Great Horned Owl (<i>Bubo virginianus</i>)	mites ^c	skin	Bequaert 1953, Maa 1969	
	<i>Blattisocius keegan</i> ^{a,c}	trees	Philips and Fain 1991	
	<i>Bubophilus ascalaphus</i>	quills	Philips and Norton 1978	
	<i>Dermonoton</i> sp. ^d	feathers	Kurey 1976	
	Epidermoptidae ^c	skin	Herman 1945	
	<i>Euschoengastia numerosa</i>	skin/nest	Wrenn and Loomis 1974	
	<i>Glaucalges attenuatus</i>	feathers	Atyeo and Philips 1984	
	<i>Harpyrhynchus</i> sp.	skin	Philips, present work	
	<i>Knemidocoptes mutans</i>	skin	Schulz et al. 1989, Schulz 1990, Malley and Whitbread 1996, Houston et al. 1998	
	<i>Kramerella</i> n. sp.	feathers	Philips and Norton 1978, Atyeo and Philips 1984, Philips 1993	
	<i>Myialges anchora</i> ^f	skin	Furman and Tarshis 1953, Bequaert 1953, Fain 1965	
	<i>Pandalura strigisoti</i>	feathers	Atyeo and Philips 1984	
	<i>Paralges</i> n. sp.	quills	Philips 1993	
	<i>Petitota bubonis</i>	feathers	Atyeo and Philips 1984	
	Glaucidium sp.	<i>Pneumophagus bubonis</i>	lungs	Fain and Smiley 1989
<i>Proctophyllodes polyxenus</i> ^a		feathers	Atyeo and Braasch 1966	
<i>Rhinoecius grandis</i>		nasal cavity	Strandtmann 1952	
<i>Neotytodectes mexicanus</i> ^b		subcutaneous	O'Connor 1981	
Ferruginous Pygmy-Owl (<i>Glaucidium brasilianum</i>)		<i>Eutrombicula alfreddugesi</i>	skin/nest	Brennan and Jones 1960, Loomis 1969
Asian Barred Owlet (<i>Glaucidium cuculoides</i>)		<i>Rhinoecius bisetosus</i>	nasal cavity	Strandtmann 1960, Wilson 1968
Mountain Pygmy-Owl (<i>Glaucidium gnoma</i>)		<i>Kramerella</i> sp.	feathers	Kurey 1976
Eurasian Pygmy-Owl (<i>Glaucidium passerinum</i>)		<i>Dermonoton eventratus</i>	feathers	Canestrini and Kramer 1899, Dubinin 1956, Radford 1953, 1958
		<i>Kramerella glaucidii</i>	feathers	Mrciak and Brander 1967, Cerný and Wiesner 1992
Pearl-spotted Owlet (<i>Glaucidium perlatum</i>)		<i>Astrida caprimulgi</i>	nasal cavity	Fain 1956a, Zumpt and Till 1961
Cuban Pygmy-Owl (<i>Glaucidium siju</i>)	<i>Tytodectes glaucidii</i>	subcutaneous	Fain 1967, Cerný 1969	
Barking Owl (<i>Ninox connivens</i>)	<i>Leptotrombidium nissani</i>	skin/nest	Domrow 1974, Domrow and Lester 1985	
	<i>Neoschoengastia americana</i>	skin/nest	Domrow and Lester 1985	
	<i>Rhinoecius cooremani</i>	nasal cavity	Domrow 1969, 1987	
Solomon Hawk-Owl (<i>Ninox jacquinoti</i>)	<i>Odontacarus trisetosus</i>	skin/nest	Goff 1979	
Morepork (<i>Ninox novaeseelandiae</i>)	<i>Leptotrombidium nissani</i>	skin/nest	Domrow 1974, Domrow and Lester 1985	
	<i>Neoschoengastia americana</i>	skin/nest	Domrow and Lester 1985	
	<i>Rhinoecius cooremani</i>	nasal cavity	Domrow 1967, 1987	
New Britain Hawk-Owl (<i>Ninox odiosa</i>)	mites ^c	skin	Maa 1966	
Philippine Hawk-Owl (<i>Ninox philippensis</i>)	Analgidae ^c	skin	Philips and Fain 1991	
	<i>Oconnoria inexpectata</i>	quills	Gaud et al. 1989	
Snowy Owl (<i>Nyctea scandiaca</i>)	<i>Knemidocoptes</i> sp.	skin	Cooper 1978, 1985	
	<i>Rhinoecius nyctae</i>	nasal cavity	Butenko 1976	

Appendix 2. Continued.

OWL	MITE	HABITAT	REFERENCES
<i>Otus</i> sp.	<i>Myialges bombycillae</i> ^c	skin	Philips and Fain 1991
Eastern Screech-Owl (<i>Otus asio</i>)	mites ^c	skin	Bequaert 1953, Fain 1965, Maa 1969
	<i>Dermanyssus americanus</i>	skin/nest	Ewing 1925, 1936, Radford 1950, Evans and Till 1962, Moss 1978
	<i>Dermonoton</i> sp.	feathers	Kurey 1976
	<i>Harpyrhynchus</i> sp.	skin	Philips 1993
	<i>Miyatrombicula cynos</i> ^b	skin/nest	Philips 1978, Philips and Dindal 1990
Variable Screech-Owl (<i>Otus atricapillus</i>)	<i>Neoschoengastia americana</i>	skin/nest	Everett et al. 1972
	Syringophilidae	quills	Johnston and Kethley 1973
Indian Scops-Owl (<i>Otus bakamoena</i>)	<i>Blankaartia sinnamaryi</i>	skin/nest	Brennan and Yunker 1966
Indian Scops-Owl (<i>Otus bakamoena</i>)	chiggers (Trombiculidae)	skin/nest	Maa and Kuo 1965
	feather mites	feathers	Maa and Kuo 1965
	<i>Dermonoton</i> sp.	feathers	McClure and Ratanaworabhan 1971
	<i>Leptotrombidium deliense</i>	nest/skin	McClure and Ratanaworabhan 1971
	<i>Ornithonyssus bursa</i>	skin/nest	McClure and Ratanaworabhan 1971
	<i>Rhinoecius cavannus</i>	nasal cavity	Wilson 1968, McClure and Ratanaworabhan 1971
	<i>Toritrombicula densipiliata</i>	skin/nest	Nadchatram 1967, Vercammen-Grandjean and Langston 1976
Indian Scops-Owl (<i>Otus bakamoena</i>)	<i>Toritrombicula vorca</i>	skin/nest	Vercammen-Grandjean and Langston 1976
	<i>Pandalura strigisoti</i>	feathers	Gaud 1980
White-faced Scops-Owl (<i>Otus leucotis</i>)	<i>Pandalura strigisoti</i>	feathers	Gaud 1980
Reddish Scops-Owl (<i>Otus rufescens</i>)	<i>Leptotrombidium deliense</i>	skin/nest	McClure and Ratanaworabhan 1971
Eurasian Scops-Owl (<i>Otus scops</i>)	<i>Toritrombicula densipiliata</i>	skin/nest	McClure and Ratanaworabhan 1971
	chiggers (Trombiculidae)	skin/nest	Maa and Kuo 1965
	feather mites	feathers	Maa and Kuo 1965
	mites ^c	skin	Maa 1969
	<i>Dermonoton parallelilobus</i> ^a	feathers	Radford 1953, 1958
	<i>Dermonoton parallelus</i>	feathers	Mégnin and Trouessart 1884c, Canestrini and Kramer 1899, Dubinin 1956, Gaud and Till 1961
	<i>Dermonoton</i> sp.	feathers	McClure and Ratanaworabhan 1971
	<i>Kramerella lunulata</i>	feathers	Dubinin 1953
	<i>Kramerella lyra</i>	feathers	Dubinin 1953
	<i>Kramerella major</i>	feathers	Shumilo et al. 1973
Eurasian Scops-Owl (<i>Otus scops</i>)	<i>Leptotrombidium deliense</i>	skin/nest	McClure and Ratanaworabhan 1971
	<i>Neoschoengastia longipes</i>	skin/nest	McClure and Ratanaworabhan 1971
	<i>Astrida caprimulgi</i>	nasal cavity	Fain 1956a, Zumpt and Till 1961
	<i>Astrida caprimulgi</i>	nasal cavity	Fain 1963a
African Scops-Owl (<i>Otus senegalensis</i>)	<i>Dermonoton</i> sp.	feathers	McClure and Ratanaworabhan 1971
	<i>Leptotrombidium scutellare</i>	skin/nest	McClure and Ratanaworabhan 1971
	<i>Neoschoengastia</i> sp.	skin/nest	McClure and Ratanaworabhan 1971
	<i>Dermonoton</i> sp.	feathers	Kurey 1976
Mountain Scops-Owl (<i>Otus spilocephalus</i>)	<i>Rhinoecius nyctea</i>	nasal cavity	Amaral 1962
Whiskered Screech-Owl (<i>Otus trichopsis</i>)	<i>Dermonoton parallelilobus</i>	feathers	Gaud 1980
Band-bellied Owl (<i>Pulsatrix melanota</i>)	<i>Rhinoecius nyctea</i>	nasal cavity	Amaral 1962
Vermiculated Fishing-Owl (<i>Scotopelia bouvieri</i>)	<i>Dermonoton parallelilobus</i>	feathers	Gaud 1980

Appendix 2. Continued.

OWL	MITE	HABITAT	REFERENCES
Pel's Fishing-Owl (<i>Scotopelia peli</i>)	<i>Dermonoton parallelilobus</i>	feathers	Gaud and Mouchet 1959b, Gaud and Till 1961, Gaud 1980
	<i>Glaucalges attenuatus</i>	feathers	Gaud and Till 1961, Gaud 1980
Burrowing Owl (<i>Speotyto cunicularia</i>)	<i>Pandalura strigisoti</i>	feathers	Gaud 1980
	<i>Dermonoton</i> sp.	feathers	Kurey 1976
	<i>Euschoengastoides gurneyi</i>	skin/nest	Loomis 1956
	<i>Hypodectes propus</i> ^a	subcutaneous	Pence and Bergan 1996
	<i>Hyponeocula montanensis</i>	skin/nest	Loomis 1956
	<i>Kramerella major</i>	feathers	Mégnin and Trouessart 1884a, Dubinin 1953, Radford 1958
	<i>Neoschoengastia americana</i>	skin/nest	Loomis 1956, Everett et al. 1972
Tawny Owl (<i>Strix aluco</i>)	<i>Proctophyllodes polyxenus</i> ^a	feathers	Atyeo and Braasch 1966
	<i>Rhinoecius bisetosus</i>	nasal cavity	Strandtmann 1952, Amaral 1962
	<i>Sternostoma augei</i>	nasal cavity	Amaral 1962
	<i>Tytodectes speotyto</i>	subcutaneous	Pence and Bergan 1996
	<i>Dermanyssus hirundinis</i> ^b	skin/nest	Zeman and Jurik 1981
	<i>Glaucalges attenuatus</i>	feathers	Atyeo pers. comm.
	<i>Kramerella aluconis</i>	feathers	Lönnfors 1937, Dubinin 1953, Radford 1958, Shumilo et al. 1973
Brown Wood-Owl (<i>Strix leptogrammica</i>)	<i>Kramerella major</i>	feathers	Dubinin 1953, Radford 1958
	<i>Pandalura strigisoti</i>	feathers	Gaud 1958, 1980
	<i>Petitota aluconis</i>	feathers	Buchholz 1869, Radford 1953, 1958
Great Grey Owl (<i>Strix nebulosa</i>)	feather mites	feathers	Maa and Kuo 1965
	<i>Dermonoton parallelilobus</i>	feathers	Mégnin and Trouessart 1884c, Canestrini and Kramer 1899, Radford 1953, 1958, Dubinin 1956, Gaud and Till 1961, Gaud 1980
Spotted Owl (<i>Strix occidentalis</i>)	<i>Kramerella aprotuberantia</i>	feathers	Philips, present work
	<i>Pandalura strigisoti</i>	feathers	Philips, present work
	<i>Passeroptes</i> n. sp.	skin	Philips, present work
	<i>Petitota</i> sp.	feathers	Philips, present work
Mottled Wood-Owl (<i>Strix ocellata</i>)	<i>Euschoengastia</i> sp. (probably <i>numerosa</i>)	skin/nest	Hunter et al. 1994, Gutiérrez et al. 1995
	<i>Myialges bombycillae</i> ^c	skin	Philips and Fain 1991
Ural Owl (<i>Strix uralensis</i>)	<i>Kramerella aprotuberantia</i>	feathers	Dubinin 1953, Radford 1958
	<i>Petitota aluconis</i>	feathers	Niethammer 1938
Barred Owl (<i>Strix varia</i>)	<i>Dermonoton</i> sp.	feathers	Kurey 1976
	<i>Dermonoton parallelilobus</i>	feathers	Banks 1915
	<i>Kramerella</i> sp.	feathers	Kurey 1976
	<i>Ornithonyssus</i> sp.	feathers	Peters 1936
	<i>Pandalura strigisoti</i>	feathers	Atyeo pers. comm.
	<i>Paralges</i> n. sp.	quills	Philips, present work
	<i>Passeroptes</i> n. sp.	skin	Philips, present work
	<i>Rhinoecius cooremani</i>	nasal cavity	Strandtmann 1952, Pence 1973
Mottled Owl (<i>Strix virgata</i>)	<i>Blankaartia sinnamaryi</i>	skin/nest	Brennan and Yunker 1966
	<i>Eutrombicula alfreddugesi</i>	skin/nest	Brennan and Jones 1960, Loomis 1969
African Wood-Owl (<i>Strix woodfordii</i>)	<i>Dermonoton</i> spp.	feathers	Cheke 1972, 1978
	<i>Glaucalges attenuatus</i>	feathers	Gaud 1980
Northern Hawk Owl (<i>Surnia uhula</i>)	<i>Kramerella major</i>	feathers	Mégnin and Trouessart 1884a, Dubinin 1953, Radford 1958

Appendix 2. Continued.

OWL	MITE	HABITAT	REFERENCES
	<i>Kramerella</i> sp.	feathers	Vasyukova et al. 1996
Family Tytonidae			
Congo Bay-Owl (<i>Phodilus prigoginei</i>)	<i>Dermonoton parallelus</i>	feathers	Gaud 1980
Barn Owl (<i>Tyto alba</i>)	mites ^c	skin	Maa 1969
	<i>Aureliania aureliani</i>	nasal cavity	Fain 1956b, 1963b, Zumpt and Till 1961, Domrow 1969, 1991
	<i>Dermonoton sclerourus</i>	feathers	Gaud 1980, D'Souza et al. 1986
	<i>Dermonoton</i> sp.	feathers	McClure and Ratanaworabhan 1971
	<i>Glaucalges attenuatus</i>	feathers	Rothschild and Clay 1952, Radford 1958, Gaud 1958, 1980, Gaud and Till 1961, Cerný 1967, D'Souza et al. 1986
	<i>Glaucalges</i> sp.	feathers	McClure and Ratanaworabhan 1971, Kurey 1976
	<i>Harpyrhynchus tyto</i>	skin	Fain 1972
	<i>Kramerella lunulata</i>	feathers	Niethammer 1938, Gaud and Petitot 1948a, Cerný 1967, Bunn et al. 1982
	<i>Kramerella lyra</i>	feathers	Radford 1958
	<i>Kramerella quadrata</i>	feathers	Gaud 1980
	<i>Kramerella</i> sp.	feathers	Kurey 1976
	<i>Leptotrombidium nissani</i>	skin/nest	Domrow 1974, Domrow and Lester 1985
	<i>Neoboydaia</i> sp.	nasal cavity	Dusbábek and Cerný 1970
	<i>Neottialges evansi</i> ^b	subcutaneous	Pence and Bergan 1996
	<i>Ornithonyssus bursa</i>	skin/nest	Domrow 1977
	<i>Ornithonyssus sylviarum</i>	skin/nest	Cooper 1978
	<i>Ornithonyssus</i> sp.	skin/nest	Keymer 1972
<i>Pandalura strigisoti</i>	feathers	Niethammer 1938, Radford 1958, Gaud 1958, Gaud and Mouchet 1959a, Gaud and Till 1961, Gaud 1980	
	<i>Rhinoecius tytonis</i>	nasal cavity	Fain 1956c, 1959a, Zumpt and Till 1961, Domrow 1969
	<i>Tytodectes strigis</i>	subcutaneous	Gene 1848, Fain 1967, Wurst and Havelka 1997
	<i>Tytodectes tyto</i>	subcutaneous	Fain 1966b, 1967, Pence and Bergan 1996
African Grass-Owl (<i>Tyto capensis</i>)	<i>Dermonoton sclerourus</i>	feathers	Gaud 1980
	<i>Kramerella quadrata</i>	feathers	Gaud 1980
Australian Masked-Owl (<i>Tyto novaehollandiae</i>)	mites ^c	skin	Maa 1966
	<i>Tytodectes tyto</i>	subcutaneous	Domrow 1992

^a These are incorrectly identified or accidental records.

^b Nest record.

^c These mites were found on louseflies (Hippoboscidae) on the bird.

^d *Dermonoton bubonis* from *Bubo* sp. (Gaud 1980) is actually an invalid nomen nudum for an undescribed species of *Dermonoton* from *Bubo virginianus* (Gaud pers. comm.).